

CLAIMS

1. A soluble lubricating surface-treated stainless steel sheet with excellent shapability for fuel tanks, comprising a substrate having on both surfaces or one surface thereof a soluble lubricating resin film, said substrate being a stainless steel sheet selected from the group consisting of an austenite-type stainless steel sheet, a ferrite-type stainless steel sheet and a two phase-type stainless steel sheet.

2. A soluble lubricating surface-treated stainless steel sheet with excellent shapability for fuel tanks, comprising a substrate having on both surfaces or one surface thereof a soluble lubricating resin film mainly comprising (A) a soluble polyurethane resin composition containing a carboxyl group or a sulfonic acid group within the molecule and having a glass transition point of 100°C or more as a dry film and (B) a lubricating function-imparting agent in an amount of from 1 to 30% by mass based on said soluble polyurethane resin composition, said substrate being a stainless steel sheet selected from the group consisting of an austenite-type stainless steel sheet, a ferrite-type stainless steel sheet and a two phase-type stainless steel sheet.

3. A soluble lubricating surface-treated stainless steel sheet with excellent shapability for fuel tanks, comprising a substrate having on both surfaces or one surface thereof a soluble lubricating resin film mainly comprising (A) a soluble polyurethane resin composition containing a carboxyl group or a sulfonic acid group within the molecule and having a glass transition point of 100°C or more as a dry film, (B) a lubricating function-imparting agent in an amount of from 1 to 30% by mass based on said soluble polyurethane resin composition and (C) silica particles in an amount of 1 to 30% by mass based on said soluble polyurethane resin composition, said substrate being a stainless steel sheet selected from the group consisting of an austenite-type stainless

steel sheet, a ferrite-type stainless steel sheet and a two phase-type stainless steel sheet.

4. The soluble lubricating surface-treated stainless steel sheet for fuel tanks as claimed in claim 2 or 3, wherein the amount of an acid group contained in (A) the soluble polyurethane resin composition for forming a soluble lubricating resin film is from 30 to 180 in terms of an acid value.

5. The soluble lubricating surface-treated stainless steel sheet for fuel tanks as claimed in claim 2 or 3, wherein the neutralizer for the acid group contained in (A) the soluble polyurethane resin composition for forming a soluble lubricating resin film is sodium hydroxide or potassium hydroxide.

6. The soluble lubricating surface-treated stainless steel sheet for fuel tanks as claimed in claim 2 or 3, wherein the main component constituting (A) the soluble polyurethane resin composition for forming a soluble lubricating resin film is polyester polyol.

7. The soluble lubricating surface-treated stainless steel sheet for fuel tanks as claimed in claim 2 or 3, wherein the main component constituting (A) the soluble polyurethane resin composition for forming a soluble lubricating resin film is polyether polyol.

8. The soluble lubricating surface-treated stainless steel sheet for fuel tanks as claimed in claim 2 or 3, wherein the lubricating function-imparting agent (B) comprises one or more members selected from the group consisting of polyolefin-based wax, fluorine-containing wax, paraffin-based wax and stearic acid-based wax.

9. The soluble lubricating surface-treated stainless steel sheet for fuel tanks as claimed in claim 2 or 3, wherein the substrate is an austenite-type stainless steel sheet comprising, in % by

mass:
C: 0.5% or less,
Si: 5% or less,

Mn: 15% or less,
P: 0.1% or less,
S: 0.05% or less,
Ni: 6 to 20%,
5 Cr: 15 to 30%,
N: 0.5% or less, and
Al: 0.001 to 5%

with the balance consisting of Fe and inevitable
impurities.

10 10. The soluble lubricating surface-treated
stainless steel sheet for fuel tanks as claimed in any
one of claims 1 to 3, wherein the substrate is a ferrite-
type stainless steel sheet comprising, in % by mass:

15 C: 0.5% or less,
Si: 3% or less,
Mn: 5% or less,
P: 0.1% or less,
S: 0.05% or less,
Ni: 5% or less,
20 Cr: 9 to 30%,
N: 0.2% or less, and
Al: 0.001 to 5%

with the balance consisting of Fe and inevitable
impurities.

25 11. The soluble lubricating surface-treated
stainless steel sheet for fuel tanks as claimed in any
one of claims 1 to 3, wherein the substrate is a two
phase-type stainless steel sheet comprising, in % by
mass:

30 C: 0.5% or less,
Si: 5% or less,
Mn: 15% or less,
P: 0.1% or less,
S: 0.05% or less,
35 Ni: 2 to 20%,
Cr: 12 to 30%,
N: 0.5% or less, and

Al: 0.001 to 5%
with the balance consisting of Fe and inevitable
impurities.

5 12. The soluble lubricating surface-treated
stainless steel sheet for fuel tanks as claimed in claim
9, wherein the substrate stainless steel sheet further
comprises one or more of, in % by mass:

Mo: 0.01 to 8%,
Cu: 0.01 to 5%,
10 Ti: 0.01 to 1%,
Nb: 0.01 to 1%,
V: 0.01 to 1%,
Mg: 0.001 to 0.1%,
Ca: 0.001 to 0.1%,
15 B: 0.0005 to 0.05%, and
W: 0.01 to 5%.

20 13. The soluble lubricating surface-treated
stainless steel sheet for fuel tanks as claimed in claim
10, wherein the substrate stainless steel sheet further
comprises one or more of, in % by mass:

Mo: 0.01 to 8%,
Cu: 0.01 to 5%,
Ti: 0.01 to 1%,
Nb: 0.01 to 1%,
25 V: 0.01 to 1%,
Mg: 0.001 to 0.1%,
Ca: 0.001 to 0.1%,
B: 0.0005 to 0.05%, and
W: 0.01 to 5%.

30 14. The soluble lubricating surface-treated
stainless steel sheet for fuel tanks as claimed in claim
11, wherein the substrate stainless steel sheet further
comprises one or more of, in % by mass:

Mo: 0.01 to 8%,
35 Cu: 0.01 to 5%,
Ti: 0.01 to 1%,
Nb: 0.01 to 1%,

V: 0.01 to 1%,
Mg: 0.001 to 0.1%,
Ca: 0.001 to 0.1%,
B: 0.0005 to 0.05%, and
5 W: 0.01 to 5%.

15. A method for manufacturing a fuel tank,
comprising a step of molding the soluble lubricating
surface-treated stainless steel sheet for fuel tank,
which is covered with a soluble lubricating resin film,
10 as claimed in any one of claims 1 to 3, a step of
treating the molded soluble lubricating surface-treated
stainless steel sheet with an alkali or hot water to
remove said soluble lubricating resin film, and a step of
welding said soluble lubricating surface-treated
15 stainless steel sheet after the removal of said soluble
lubricating resin film.

16. The method as claimed in claim 15, wherein the
substrate is an austenite-type stainless steel sheet
comprising, in % by

20 mass:
C: 0.5% or less,
Si: 5% or less,
Mn: 15% or less,
P: 0.1% or less,
25 S: 0.05% or less,
Ni: 6 to 20%,
Cr: 15 to 30%,
N: 0.5% or less, and
Al: 0.001 to 5%

30 with the balance consisting of Fe and inevitable
impurities.

17. The method as claimed in claim 15, wherein the
substrate is a ferrite-type stainless steel sheet
comprising, in % by mass:

35 C: 0.5% or less,
Si: 3% or less,
Mn: 5% or less,

P: 0.1% or less,
S: 0.05% or less,
Ni: 5% or less,
Cr: 9 to 30%,
5 N: 0.2% or less, and
Al: 0.001 to 5%

with the balance consisting of Fe and inevitable impurities.

10 18. The method as claimed in claim 15, wherein the substrate is a two phase-type stainless steel sheet comprising, in % by mass:

C: 0.5% or less,
Si: 5% or less,
Mn: 15% or less,
15 P: 0.1% or less,
S: 0.05% or less,
Ni: 2 to 20%,
Cr: 12 to 30%,
N: 0.5% or less, and
20 Al: 0.001 to 5%

with the balance consisting of Fe and inevitable impurities.

25 19. The method as claimed in claim 16, wherein the substrate stainless steel sheet further comprises one or more of, in % by mass:

Mo: 0.01 to 8%,
Cu: 0.01 to 5%,
Ti: 0.01 to 1%,
Nb: 0.01 to 1%,
30 V: 0.01 to 1%,
Mg: 0.001 to 0.1%,
Ca: 0.001 to 0.1%,
B: 0.0005 to 0.05%, and
W: 0.01 to 5%.

35 20. The method as claimed in claim 17, wherein the substrate stainless steel sheet further comprises one or more of, in % by mass:

Mo: 0.01 to 8%,
Cu: 0.01 to 5%,
Ti: 0.01 to 1%,
Nb: 0.01 to 1%,
V: 0.01 to 1%,
Mg: 0.001 to 0.1%,
Ca: 0.001 to 0.1%,
B: 0.0005 to 0.05%, and
W: 0.01 to 5%.

5

21. The method as claimed in claim 18, wherein the substrate stainless steel sheet further comprises one or more of, in % by mass:

Mo: 0.01 to 8%,
Cu: 0.01 to 5%,
Ti: 0.01 to 1%,
Nb: 0.01 to 1%,
V: 0.01 to 1%,
Mg: 0.001 to 0.1%,
Ca: 0.001 to 0.1%,
B: 0.0005 to 0.05%, and
W: 0.01 to 5%.

10

15

20